

WHAT IS CLAIMED IS:

1. A cluster system comprising:

a plurality of computers;

a data storage device;

5 a cluster file system providing exclusive control
for maintaining data consistency by using a lock
function in order to offer shared access to a file
recorded on the data storage device from a process
operating on the plurality of computers;

10 cluster shared memory map means for allocating an
area for shared memory in an address space of the
process and for mapping data of files managed by the
cluster file system in the area; and

15 cluster shared memory lock allocation means for
allocating the lock function of the cluster file system
to the shared memory and enabling exclusive control for
maintaining data consistency on the shared memory.

2. The cluster system according to claim 1,

further comprising:

20 access inhibit setting means for inhibiting an
access to all pages in the allocated shared memory;

data write means, when accessing the access-
inhibited page causes a read page fault, for reading
the data mapped to the page from the file recorded on
25 the data storage device and writing the read data; and

setting means for read-enabling the page where the
data is written to be readable.

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3. The cluster system according to claim 1,
further comprising:

access inhibit setting means for inhibiting access
to all pages in the allocated shared memory;

5 data write means, when accessing the access-
inhibited page causes a write page fault, for reading
the data mapped to the page from the file recorded on
the data storage device and writing the read data; and

10 setting means for read/write-enabling the page
where the data is written.

4. The cluster system according to claim 3,
further comprising:

means for acquiring a lock, when the cluster
shared memory is locked, by access-inhibiting a page in
15 a cluster shared memory area where a file managed by
the cluster file system is mapped in the address space
for the process; and

means for writing data of an updated page in the
cluster shared memory area back to a file managed by
20 the cluster file system when the acquired lock is
unlocked.

25 5. A memory access control method applied to a
cluster system having a plurality of computers, a data
storage device, and a cluster file system providing
exclusive control for maintaining data consistency by
means of a lock function in order to allow shared
access from a process operating on the plurality of

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computers to a file recorded in the data storage device,
the method comprising the steps of:

allocating an area for shared memory in an address
space of the process and mapping data of files managed
by the cluster file system in the area; and

allocating the lock function of the cluster file
system to the shared memory and enabling exclusive
control for maintaining data consistency on the shared
memory.

6. The memory access control method according to
claim 5, further comprising the steps of:

inhibiting an access to all pages in the allocated
shared memory;

when accessing the access-inhibited page causes a
read page fault, reading the data mapped to the page
from the file recorded on the data storage device and
writing the read data; and

read-enabling the page where the data is written
to be readable.

7. The memory access control method according to
claim 5, further comprising the steps of:

inhibiting access to all pages in the allocated
shared memory;

when accessing the access-inhibited page causes a
write page fault, reading the data mapped to the page
from the file recorded on the data storage device and
writing the read data; and

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read/write-enabling the page where the data is written.

8. The memory access control method according to claim 7, further comprising the steps of:

5 acquiring a lock, when the cluster shared memory is locked, by access-inhibiting a page in a cluster shared memory area where a file managed by the cluster file system is mapped in the address space for the process; and

10 writing data of an updated page in the cluster shared memory area back to a file managed by the cluster file system when the acquired lock is unlocked.

9. A recording medium storing computer-executable program code for memory access control in a cluster system having a plurality of computers, a data storage device, and a cluster file system providing exclusive control for maintaining data consistency by means of a lock function in order to allow shared access from a process operating on the plurality of computers to a 20 file recorded in the data storage device, the program code comprising:

means for causing a computer to allocate an area for shared memory in an address space for the process and map data of a file managed by the cluster file system to the area; and

25 means for causing a computer to allocate the lock function of the cluster file system to the shared

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memory and enable exclusive control for maintaining data consistency on the shared memory.

10. The recording medium according to claim 9, wherein the program code further comprises:

5 means for causing a computer to inhibit access to all pages in the allocated shared memory;

means for causing, when accessing the access-inhibited page causes a read page fault, a computer to read the data mapped to the page from the file recorded on the data storage device and write the read data; and
10 means for causing a computer to read-enable the page where the data is written to be readable.

11. The recording medium according to claim 9, wherein the program code further comprises:

15 means for causing a computer to inhibit access to all pages in the allocated shared memory;

means for causing, when accessing the access-inhibited page causes a write page fault, a computer to read the data mapped to the page from the file recorded on the data storage device and write the read data; and
20 means for causing a computer to read/write-enable the page where the data is written.

12. The recording medium according to claim 11, wherein the program code further comprises:

25 means for causing a computer to acquire a lock, when the cluster shared memory is locked, by access-inhibiting a page in a cluster shared memory area where

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a file managed by the cluster file system is mapped in
the address space for the process; and

means for causing a computer to write data of an
updated page in the cluster shared memory area back to

- 5 a file managed by the cluster file system when the
acquired lock is unlocked.